

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
WASHINGTON, D.C.

AND

UTAH AGRICULTURAL EXPERIMENT STATION
UTAH STATE UNIVERSITY
LOGAN, UT

NOTICE OF RELEASE OF PLEASANT VALLEY GERmplASM

The USDA-Agricultural Research Service and the Utah Agricultural Experiment Station announce the release of Pleasant Valley Germplasm bottlebrush squirreltail (*Elymus elymoides* [Raf.] Swezey). This selected class (natural track) of pre-variety germplasm, tested under the experimental designation T-1346, is eligible for seed certification under guidelines developed by the Association of Seed Certifying Agencies (2001). This alternative release procedure is being utilized because propagation material of specific ecotypes is needed for ecosystem restoration, potential for immediate use is high, and commercial potential beyond specific restoration and reclamation objectives is probably limited (Young, 1995). Primary beneficiaries of this release are anticipated to be land management agencies, particularly the U.S. Forest Service and the Bureau of Land Management, as well as the seed industry.

Squirreltail taxa were described by Wilson (1963), and revised names are summarized by Barkworth (1997). Comparison of *E. elymoides* ssp. *elymoides* with ssp. *brevifolius* and *E. multisetus* for plant traits was made by Jones et al. (2003). Like most *Elymus* species, the squirreltails are self-pollinated (Jensen et al., 1990).

Recent work with AFLP molecular genetic markers (Larson et al., 2003; Parsons, 2008) provides justification for a yet undescribed subspecies of bottlebrush squirreltail currently referred to as "race C", which encompasses Pleasant Valley Germplasm. While race C keys to *E. elymoides* ssp. *brevifolius* according to Wilson (1963), it is genetically (Larson et al., 2003) and geographically (Wilson, 1963) disjunct from ssp. *brevifolius* races A, B, and D. Races A, B, C, and D were delineated as discrete groups of accessions with AFLP markers (Larson et al., 2003), and races A, B, and C were characterized for whole-plant traits by Jones et al. (2003). For example, race B is early in maturity, race C is intermediate in maturity, and race A is very late in maturity. Also, race A is taller and possesses heavier seeds than races B or C, which were similar to each other. While no key is available to distinguish the races of *E. elymoides* ssp. *brevifolius*, race may be deduced from geographic origin. Race C is found in eastern and central Oregon and portions of surrounding states, while Races A and B are found in the Rocky Mountains and Race D is found in the western Great Plains (Larson et al., 2003). The type specimen for the subspecies originated near Silverton, CO (Wilson, 1963), and its description conforms to race A. The only previous releases of ssp. *brevifolius* are Tusas, Wapiti, and Pueblo germplasms (all race A).

A field trial of 32 race C accessions (Fig. 1) was established at the Millville Experimental Farm, Millville, UT, on 13 May 2005 from greenhouse-grown transplants. Fourteen-plant plots were arranged in a randomized complete block design with three replications. Data were compiled on phenological dates in 2006 and 2007 (Table 1), biomass in 2006 and 2007 and seed yield and mass in 2006 (Table 2), and canopy traits in 2006 and 2007 (Table 3). Seedling data were collected in a greenhouse evaluation (data not shown). Based on a multivariate analysis of trait performance in field and greenhouse evaluations, Parsons (2008) delineated four adaptive zones (AZ) for race C (Fig. 2). Accession T-1346 grouped with

two other eastern Blue Mountain accessions into AZ-1. This accession was chosen for release as Pleasant Valley Germplasm based on its high seed yield relative to the other AZ-1 accessions (Table 2).

Accession T-1346 was collected 12 July 2002 in Baker County, OR on a southwest-facing slope near Interstate-84 exit 315 about nine miles southeast of Baker City. Coordinates are 44.67 oN 117.62 oW. Elevation at the site is 1,166 m, average annual precipitation is 361 mm, USDA plant hardiness zone is 5a, and AHS plant heat-zone is 5. The site is classified by USDA-NRCS (Anonymous, 1981) as Major Land Resource Area B10 (Upper Snake River Lava Plains and Hills), by the USDA-Forest Service (Bailey, 1995) as Province M332 (Middle Rocky Mountain Steppe – Coniferous Forest – Alpine Meadow Province), and by the EPA (2002) as Level IV Ecoregion 11i (Blue Mountains, Continental Zone Foothills). Native perennial grasses present at the site were basin wildrye (*Leymus cinereus*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and sandberg bluegrass (*Poa secunda*). Rabbitbrush (*Chrysothamnus* spp.) was present, but fire had removed big sagebrush (*Artemisia tridentata*). Native forbs included western yarrow (*Achillea lanulosa*), sego lily (*Calochortus* sp.), tapertip hawksbeard (*Crepis acuminata*), curlycup gumweed (*Grindelia squarrosa*), and *Phacelia* spp. The presence of the invasive annual introduced grass, downy brome (*Bromus tectorum*), was also noted.

Seed of the G2 generation will be maintained by the USDA-ARS Forage and Range Research Laboratory, Logan, UT and will be made available to growers by the Utah Crop Improvement Association. Seed through the G5 generation will be eligible for certification.

Seed of Pleasant Valley Germplasm will be donated to the National Plant Germplasm System. Small quantities of seed can be obtained for research purposes by contacting David Stout, Western Regional Plant Introduction Station, Washington State University, Pullman, WA 99164-6402. Appropriate recognition should be made if this material contributes to the development of a new breeding line or cultivar.

REFERENCES

- Anonymous. 1981. Land resource regions and major land resource areas of the United States. USDA-SCS Agric. Handb. 296. U.S. Gov. Print. Office, Washington, DC.
- Association of Official Seed Certifying Agencies. 2001. Genetic and crop standards of the Association of Official Seed Certifying Agencies. p. 1-12 to 1-14, 2-69 to 2-72. AOSCA, Boise, ID.
- Bailey, R.G. 1995. Description of the ecoregions of the United States. 2nd ed. USDA Forest Service Misc. Publ. No. 1391 (rev.), Washington, D.C.
- Barkworth, M.E. 1997. Taxonomic and nomenclatural comments on the Triticeae in North America. *Phytologia* 83:302-311.
- Environmental Protection Agency. 2002. Level III ecoregions of the conterminous United States. URL:http://www.epa.gov/wed/pages/ecoregions/level_iii.htm (accessed 19 May 2009). Western Ecology Division, Corvallis, OR.
- Jensen, K.B., Y.F. Zhang, and D.R. Dewey. 1990. Mode of pollination of perennial species of the Triticeae in relation to genomically defined genera. *Can. J. Plant Sci.* 70:215-225.
- Jones, T.A., D.C. Nielson, J.T. Arredondo, and M.G. Redinbaugh. 2003. Characterization of diversity among three squirreltail taxa. *J. Range Manage.* 56:474-482.

Larson, S.R., T.A. Jones, C.L. McCracken, and K.B. Jensen. 2003. Amplified fragment length polymorphism in *Elymus elymoides*, *E. multisetus*, and other *Elymus* taxa. *Can. J. Bot.* 81:789-805.

Parsons, M.C. 2008. Ecotypic variation in *Elymus elymoides* subspecies *brevifolius* race C in the Northern Intermountain West. M.S. Thesis. Utah State University, Logan, UT.

Wilson, F.D. 1963. Revision of *Sitanion* (Triticeae, Gramineae). *Brittonia* 15:303-323.

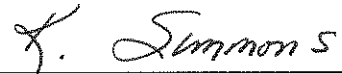
Young, S.A. 1995. Verification of germplasm origin and genetic status by seed certification agencies. p. 293-295. In B.A. Roundy et al. (compilers) *Proc. Wildland shrub and arid land restoration symposium*. Intermountain Res. Stn. Gen. Tech. Rep. INT-GTR-315. USDA-Forest Service, Ogden, UT.

Signatures:



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Date



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Date